

**What is claimed is:**

- 1. A crystal oscillator nanochannel sensor comprising a nanochannel body thin film which has an oxide layer including surfactant micelles and is disposed on the surface of an electrode on a crystal oscillator of a crystal oscillator microbalance, the sensor detecting a change in the weight of the nanochannel body thin film, which change is caused by a collected target substance, as a change in the frequency of the crystal oscillator to thereby detect the existence of the target substance.**
- 2. A crystal oscillator nanochannel sensor comprising a nanochannel body thin film in which a nanochannel body of the oxide layer is chemically modified and which is disposed on an electrode on a crystal oscillator of a crystal oscillator microbalance, the sensor detecting a change in the weight of the nanochannel body thin film, which change is caused by a collected target substance, as a change in the frequency of the crystal oscillator to thereby detect the existence of the target substance.**
- 3. The crystal oscillator nanochannel sensor according to claim 1 or 2, wherein the oxide layer of the nanochannel body is constituted primarily of silicon oxide.**
- 4. The crystal oscillator nanochannel sensor according to any of claims 1 to 3, the sensor detecting the existence of a target substance in a sample liquid phase.**
- 5. The crystal oscillator nanochannel sensor according to claim 1 or 4, the sensor detecting the existence of a target substance by mixing a recognition reagent and a sample solution and extracting the recognition reagent and the target substance collected by the reagent in the nanochannel.**
- 6. The crystal oscillator nanochannel sensor according to claim 4, the sensor detecting the existence of a target substance by impregnating a nanochannel with a recognition reagent in advance to make the included recognition reagent collect a target substance in a sample solution.**
- 7. The crystal oscillator nanochannel sensor according to any of claims 1 to 3, the sensor**

**detecting the existence of a target substance in a sample vapor phase.**